CLAIMS

1.- A method for capacitive detection of the presence of target sample on a substrate, comprising the steps of:

- binding a target sample to selective binding sites on the substrate, the target sample being directly or indirectly labelled with conductive labels,

- sensing the presence of the bound conductive labels to a binding site to thereby determine the presence of the target sample,

wherein the sensing step is carried out by a non-ohmic contacting, capacitive detection of the presence of the conductive labels.

2.- A method according to claim 1, furthermore comprising, before the binding step, a preliminary capacitance measuring step.

3.- A method according to claim 2, furthermore comprising a step of comparing the preliminary capacitance with the capacitance measured during the sensing step.

4.- A method according to any of the previous claims, wherein the labels are formed or enlarged prior to or during the sensing step.

5.- A method according to claim 4, wherein the labels are formed or enlarged by precipitation of a metal.

6.- A method according to any of the previous claims, wherein capacitance is measured as function of frequency to obtain a value representative of a electrical resistive property of the conductive label.

7.- A method according to any of the previous claims, wherein a global impedance is measured and the real part of the global impedance is used in addition to the capacitive part.

8.- A method according to any of the previous claims, furthermore comprising a step of optical detection of the presence of the label.

9.- A method according to any of the previous claims, furthermore comprising a step of magnetic or radioactive emissions detection of the presence of the label.

10.- Capacitive sensor device for determining the presence of a target sample in a solution, conductive labels being directly or indirectly couplable to the target sample, the capacitive sensor device comprising a substrate being able to selectively bind at a binding site or having attached thereto a binding site able to selectively bind a target sample, a capacitive sensor element, and sensing

circuitry for determining the presence of a target sample bound to the binding site by application of electrical signals to the capacitive sensor element, wherein the capacitive sensor element comprises a set of at least two electrodes with non-conductive surfaces in a region associated with the binding site which electrically isolate the electrodes from the solution used for the determination.

11.- Capacitive sensor device according to claim 10, wherein the intercapacitance value of the electrodes changes when detecting the presence of conductive labels at least when coupled to the target sample.

12.- Capacitive sensor device according to any of claims 10 or 11, wherein the set of electrodes are an array of parallel fingers which can be individually addressed in pairs.

13.- Capacitive sensor device according to any of claims 10 to 12, wherein the set of electrodes are interdigitated electrodes with parallel fingers, all fingers related to one electrode being short-circuited.

14.- Capacitive sensor device according to any of claims 10 or 11, wherein the set of electrodes are an array of crossed fingers whose intersections can be individually addressed in pairs.

15.- Capacitive sensor device according to any of claims 10 or 11, wherein the set of electrodes are a matrix of point electrodes.

16.- Capacitive sensor device according to any of claims 10 to 15, wherein a third electrode is provided insulated from the set of at least two electrodes, enabling the measurement of a second set of capacitive values.

17.- Capacitive sensor device according to any of claims 10 to 16, wherein the substrate comprises a semiconductive layer.

18.- Capacitive sensor device according to any of claims 10 to 17, wherein the presence of the conductive label creates a gate of a MOS or EEPROM like structure embedded in the semiconductor below the binding test sites.

19.- Capacitive sensor device according to any of claims 10 to 18, wherein the distance between the electrodes is reduced to a dimension comparable with the size of a single label.

20.- Capacitive sensor device according to claim 19, wherein the distance between two electrodes is 5 μm or less, preferably 2 μm or less.

21.- Capacitive sensor device according to any of claims 10 to 20, furthermore comprising a comparator unit, the outputs of the first and second capacitive

sensing elements or first and second groups of capacitive sensing elements being fed to a comparator unit.

22.- Capacitive sensor device according to any of claims 10 to 21, furthermore comprising an optical detector for determining the presence of the target sample.

23.- Capacitive sensor device according to any of claims 10 to 22, furthermore comprising a magnetic or radioactive emissions sensor for determining the presence of the target sample.

24.- Capacitive sensor according to any of claims 10 to 23, wherein the electrodes are made from a metal.

25.- Capacitive sensor according to claim 14, wherein the non-conductive surfaces are an oxide layer, a nitride layer, a paint or a lacquer.

26, - Capacitive sensor according to claim 24, wherein the metal is aluminium, and the non-conductive surfaces are formed by alumina.

27.- Capacitive sensor according to claim 24 or 25, wherein the metal is a non-noble metal.